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Treatment of central retinal vein occlusion by injection of tissue plasminogen activator into a retinal vein .

Weiss, Jeffrey N.
American Journal of Ophthalmology, v126, n1, p142(3)
July,
1998
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PURPOSE: To report the injection of tissue plasminogen activator into a retinal vein to treat central retinal vein occlusion .

METHODS: An 81-year-old woman with visual loss of the right eye secondary to central retinal vein occlusion developed central retinal vein occlusion and visual loss in her left eye. Treatment of her left eye with topical ocular hypotensive medications, pentoxifylline, and laser chorioretinal anastomosis was without benefit. Thereafter, she underwent vitreoretinal surgery, including tissue plasminogen activator injection into a branch retinal vein of her left eye.

RESULTS: The patient reported subjective improvement in the vision of her left eye. Ophthalmoscopic and fluorescein angiographic improvement were also noted.

CONCLUSION: The feasibility of cannulating a retinal vein for treatment has been demonstrated. (Am J Ophthalmol 1998;126:142-144.

CENTRAL RETINAL VEIN OCCLUSION IS A COMMON retinal - vascular disorder with potentially blinding complications. An increased risk of central retinal vein occlusion has been found in patients with systemic hypertension, diabetes mellitus, and open-angle glaucoma.(1) Histopathologic studies have demonstrated thrombosis at the lamina cribrosa.(2) The anatomy of the lamina cribrosa provide a mechanical factor for thrombosis and an increase in coagulability, increase in blood viscosity, and/or venous stasis provide a hematologic predisposition for thrombosis.(3)

An 80-year-old woman with hypercholesterolemia experienced a

central retinal vein occlusion of the right eye. One month later, rubeosis irides and neovascular glaucoma were noted, and panretinal laser photocoagulation was performed. The right eye was stable 1 year later, with a best-corrected visual acuity of RE, 8/200, when she presented with central retinal vein occlusion in her left eye. Treatment with topical ocular hypotensive medications and pentoxifylline were without benefit. A laser chorioretinal anastomosis was attempted but was not successful, and her best-corrected visual acuity declined to 20/400, with extensive hemorrhages observed in all retinal quadrants.

After extensive discussion and mandatory second opinion, the patient agreed to undergo experimental retinal surgery for this condition. Informed consent included the risk of retinal detachment and intraocular hemorrhage resulting from cannulating the retinal vein and tissue plasminogen activator injection . The procedure was approved by the Institutional Review Board.

On the left eye, a standard three-port vitrectomy was initially performed. Using a 33-gauge needle and mechanical micromanipulator that I had designed, an additional sclerotomy was made so that the needle would be parallel to the lumen of the selected superior branch retinal vein near the optic disk. A chandelier light source was used to minimize intraocular movement. The patient's intraocular pressure was lowered to 5 mm Hg, and spontaneous venous pulsations were observed. The vessel was entered by remote mechanical control, which maintained ocular stability, and there was no hemorrhaging. A bolus of 20 (micro)g/0.1 ml of tissue plasminogen activator was injected toward the optic nerve head. Intraocular pressure was raised to 25 mm Hg, and the cannula was removed without hemorrhaging from the retinal vessel. When her intraocular pressure was raised to 30 mm Hg, venous pulsations were produced. Laser photocoagulation or gas tamponade was not required. There were no intraoperative or postsurgical complications.

A preoperative fluorescein angiogram of the left eye demonstrated venous filling at 33 seconds, whereas the same study performed approximately 3 weeks postoperatively showed venous filling at 24 seconds. Subsequent to the surgery, there was a notable decrease in the amount

of
retinal hemorrhaging observed, especially nasally.

Approximately 3 months postoperatively, and though the patient reported an improvement in vision, neovascularization of the angle was observed. Panretinal laser photocoagulation was performed with complete
resolution of the neovascularization and an improvement in best-corrected
visual acuity to LE, 20/400. Approximately 9 months postvitreoretinal surgery and 5 months postlaser photocoagulation, the best-corrected visual
acuity was stable at LE, 20/400, and the patient remained pleased with her
perceived visual improvement.

The cannulation of retinal vessels in animals has been described,(4) as has tissue plasminogen activator therapy for central
retinal vein occlusion in patients. To the best of my knowledge, this
is the first report of cannulation of a retinal vein with injection
of tissue plasminogen activator in a patient with a central retinal vein occlusion .(5)

This case demonstrates that it is clinically possible to cannulate a
retinal vessel and safely infuse a drug. I am presently developing a smaller cannula and improving the ease of use of the micromanipulator. Whether this technique will prove beneficial in the treatment of central
retinal vein occlusion , ocular tumors, and other retinal and retinal -vascular disorders that would benefit from local targeting of drug
treatment remains to be determined by larger controlled clinical studies.

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activator
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